Greenback Parrotfish Status Review Report: ID 272

Peer Review Comments

We solicited review of the Status Review Report from eight potential reviewers. Three people agreed to be reviewers, two of which provided reviews. Reviewer comments are compiled below from comments on drafts of the manuscript and are not in the order of the reviewer identification list below.

<u>Reviewers (listed alphabetically)</u>

John Howard Choat
Adjunct Professor
Marine and Tropical Biology
James Cook University
Townsville, Australia

Robert R. Warner
Research Professor of Marine Biology
Ecology, Evolution, and Marine Biology
University of California
Santa Barbara, California, USA

<u>Reviewer #1 Comments in Response to Peer Review Charge</u>

1. In general, does the Status Review Report include and cite the best scientific and commercial information available on the species, its biology, stock structure, habitats, and threats?

Yes. The review of existing information in both published and "gray" literature was impressive. I know of no other sources of information.

2. Are the scientific conclusions factually supported, sound, and logical?

Yes. Unfortunately, there is a large amount of uncertainty due to a lack of information, and the basis for the various evaluations and determinations were carefully explained. There was no indication of an agenda-driven selective attention to the evidence. Instead, I was impressed with the objectivity displayed in the document.

3. Where available, are opposing scientific studies or theories acknowledged and discussed?

Evidence for overfishing of the greenback parrotfish in certain areas was presented clearly, but it is also clear that other areas appear to maintain significant populations. I think this was done as objectively as the sparse data allowed.

4. Are uncertainties assessed and clearly stated?

Yes, and there are many of them, given a pervasive lack of information.

5. Other Comments

Overall, I found this status report particularly well done, given the evidence presented in the report itself. However, I am not an expert in this geographical area, and evaluations from others with greater expertise would be more informative.

Reviewer #2 Comments in Response to Peer Review Charge

1. In general, does the Status Review Report include and cite the best scientific and commercial information available on the species, its biology, stock structure, habitats, and threats? 2. Are the scientific conclusions factually supported, sound, and logical? 3. Where available, are opposing scientific studies or theories acknowledged and discussed? 4. Are uncertainties assessed and clearly stated?

*Firstly in my view they is no support for declaring this species as subject to a threat of **extinction.** There is credible evidence for localized overfishing resulting in region specific declines in number and mean size of Scarus trispinosus and it is clear that further MPAs are necessary if there is a wish to rebuild biomass and size structure of this species in areas subject to recreation and commercial fishing. However this is not going to lead to extinction. It has previously been a general consideration that small range endemic species will be more vulnerable to extinction than those with broader geographic ranges especially in coral reef ecosystems. However as Hughes et al (2014) point out there is increasing evidence that endemics are frequently very abundant within their range and even in endemics species occupy a wide variety of habitats. Good examples of this are found in the literature on small range endemics among angel fishes (Hobbs et al 2010). Moreover endemic species subject to high but localized exploitation rates still maintain viable populations (Harasti &.Malcolm, 2013). In the present case although there have been declines in the abundance of the target species the abundances recorded for this species are very high when compared with similar sized species in the north-western tropical Atlantic (Debrot et al 2007).*

A more pertinent comment concerns the scientific quality and veracity of the quantitative data cited in this report. The authors have done as well as possible with the information available but the material they have had to work with has made the task that much more difficult. While the sample size quoted are adequate the level of analysis and estimates of variables such as mean age, growth and morality rates and mean density cross a variety of locations are inadequate for resolving the issues of likely hood of extinction.

The important issues in this context are as follows. Statistically rigorous estimates of vulnerability in parrotfishes strongly suggest that combinations of age based-demographic reproductive which demands knowledge of initial growth rates and mean size and life span are

critical features in this context (Taylor et al 2014). The standard information with respect to reef fish age-based demography is invariably in the form of the VBGF parameters K L_{inf} and t_o, none of which are informative when attempting to estimate demographic performance under different conditions of stress. K is not an estimate of growth rate and practitioners would do well to refer to the re-parametized rVBGF (Francis1988). And although there is some attempt to provide an estimate of size and therefore age at maturity with estimates of longevity it is not possible to calculate generation time.

The section on protogyny is in need of revision as it is now clear that some parrotfishes do indeed recruit males via pre-maturational sex change (Hamilton et al 2008).

With respect to the assessment of risk I agree with the authors that nothing in the demographic and habitat related risk factors justifies a conclusion that extinction is highly unlikely. There is evidence that the future maintenance of populations of S.trispinosus is dependent on a more pro-active and informed regulatory regime. However the suggestion that recruitment may fluctuate naturally (Fig 6) implies that a more rigorous monitoring regime is required to resolve the relative importance of anthropogenic vs natural fluctuations in recruitment rate as drivers of locality specific abundance. In addition a more informed picture of the structure of reef systems and the spatial configuration of different habitats is required. It does not help to state that the species is a habitat generalist occupying sea-grass coral and rocky reef habitats without some measure of the spatial pattern of the environment. Finally it does not help to include statements about the importance of parrotfish as the primary mediators of coral/algal interactions of coral reefs and the dire consequences of overfishing in a tightly focused and factual document such as this review. A majority of these statements are not backed up by credible evidence and reflect author's opinions more than anything else.

I am in agreement with the main conclusion of Table 3 but consider it foolish to include sampling for scientific purposes in a manner that equates it with commercial and recreational fishing. Given the likelihood of localized recruitment patterns as evidence by numerous estimates provided by parentage analysis in reef fishes I would advocate the need to establish a wide range of well policed marine reserves that would allow the rebuilding of reproductive biomass and size structure of this species as an insurance against future increases in fishing pressure.

References cited

Debrot, D., Choat, J.H., Posada, J.M., and Robertson, D.R. 2007. High Densities of the Large Bodied Parrotfishes (Scaridae) at Two Venezuelan Offshore Reefs: Comparison Among Four Localities in the Caribbean. Proceedings of the 60th Gulf and Caribbean Fisheries Institute November 5 - 9, 2007 Punta Cana, Dominican Republic.

Francis RICC (1988) Maximum likelihood estimation ofgrowth and growth variability from tagging data. N Z JMar Freshw Res 22:43–52

Hamilon R, Adams S Choat JH (2008)Sexual development and reproductive demography of the green humphead parrotfish (Bolbometopon muricatum) in the Solomon Islands Coral reefs 27:153-163.

Harasti H.Malcolm (2013) Distribution, relative abundance and size composition of the threatened serranid Epinephelus daemelii in New South Wales, Australia Journal of Fish Biology 83: 378–395

Hobbs JP, Jones GP, Munday PL(2010)Rarity and extinction risk in coral reef angelfishes on isolated islands: interrelationships among abundance, geographic range size and specialization. Coral Reefs 29:1-11

Hughes et al., Double Jeopardy and Global Extinction Risk in Corals and Reef Fishes, Current Biology (2014), http://dx.doi.org/10.1016/j.cub.2014.10.037